Meteor radar functionality on the PANSY radar

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The Program of the Antarctic Syowa MST/IS radar (PANSY) is a large atmospheric radar at the Syowa station. It started the full-system observation from late 2015. The PANSY radar can continuously observe the turbulent wind velocity in the troposphere, stratosphere, and mesosphere. While the Polar Mesosphere Summer Echoes (PMSEs) and the Polar Mesosphere Winter Echoes (PMWEs) are well observed by the PANSY radar in the mesosphere region, they are highly seasonal and mostly observed in the daytime. Compared to the PMSEs and PMWEs, meteor echoes are frequently observed throughout the year, and also in the nighttime. Therefore, it is desirable to utilize them as an additional source for the continuous estimation of the wind velocities around 90 km.

Meteor radar observes the radial Doppler velocity and the direction of arrival (DOA) with the spatially-distributed radar interferometry technique to compose the wind velocity vectors. To implement the meteor radar functionality on the PANSY radar, however, there were several difficulties. Although the PANSY radar was already capable of dividing the entire array into separate receiver channels, there were no closely-arranged antennas for that purpose to remove the ambiguities in the DOA estimation. In addition, the on-line analysis software was needed to integrate it into the regular observations.

In this presentation, the current status of the installation of the meteor radar functionality on the PANSY radar is reported, including the specifications of the interferometer array and the signal processing procedures for the online analysis. It is planned to realize the wind observation using the meteor echoes in the next season of the PMSE from late 2018.